

United States  
Environmental Protection  
Agency

Solid Waste and  
Emergency Response  
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# **Regulatory Determination**

## **Landfills and Surface Impoundments Receiving Pulp and Paper Mill Sludge**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

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OFFICE OF  
SOLID WASTE AND EMERGENCY RESPONSE

Mark Van Putten, Esq.  
National Wildlife Federation  
Great Lakes National Resource Center  
802 Monroe  
Ann Arbor, MI 48104

Karen Florini, Esq.  
Environmental Defense Fund  
1616 P Street, N.W.  
Washington, D.C. 20036

Re: Consent Decree in Environmental Defense Fund and  
National Wildlife Federation v. Thomas, (D.D.C. No. 85-  
0973, July 27, 1988)

Dear Counsel:

The Environmental Protection Agency (EPA), in compliance with paragraph 17(B) of the subject Consent Decree, hereby informs you that it has made a determination not to promulgate additional regulations for landfills and surface impoundments receiving sludge from chlorine and chlorine derivative bleached pulp and paper mills under Subtitle D of the Resource Conservation and Recovery Act (RCRA). EPA has based its determination on several factors.

EPA has concluded that, under current conditions, dioxin contained in pulp and paper mill sludges does not pose an unreasonable risk to human health and the environment when disposed in landfills and surface impoundments.

The Agency's initial comprehensive risk assessment (provided to you in 1990 under this consent decree) indicated that the major potential risk to human health from these disposal units is contamination of surface waters and subsequent bioaccumulation of dioxin in fish resulting from run-off from these units. Based on information more recently collected by the Agency under this consent decree, EPA has concluded that human health risks are minimal because: (1) almost all of these facilities have run-off controls that would substantially mitigate potential risk and (2) the incorporation of more realistic assumptions and new site specific information in EPA's risk assessment show the risks to human health are considerably lower than previously estimated, even without run-off controls.

The Agency has also evaluated the potential risks to wildlife from these disposal units as part of today's action, even though in the 1990 risk assessment this pathway was not considered

significant enough to evaluate. The Agency has concluded that there would be exposure and potential risk to wildlife that actively forage in these disposal units. However, current evidence does not indicate significant levels of foraging or other biological activities that would lead to significant exposure at these units. In addition, there are significant ecological differences that generally exist between these units and land application sites where pulp and paper mill sludges are disposed directly into wildlife habitats and feeding areas (and for which the Agency recently proposed regulations under the Toxic Substances Control Act (TSCA)). EPA has no reason to believe, therefore, that there is significant exposure at these sites.

The conditions within these sludge disposal units are visibly and biologically different from the conditions at land application sites. For example, because of the physical nature of these units, active landfills and surface impoundments do not appear to provide a suitable habitat (i.e., a place to live) for many species. Daily disposal operations, using trucks, bulldozers, pipelines and other types of sludge spreaders, are expected to further reduce the likelihood that individual landfills and surface impoundments would be available for wildlife as a feeding source. Therefore, wildlife would generally have to come from habitat areas outside the landfill or surface impoundment to feed. Landfills and surface impoundments are often at least partially separated from habitat areas by industrial activity and structures, which would impede access to these units. EPA has enclosed photographs with this letter which illustrate differences in the physical nature of landfills and surface impoundments versus land application facilities.

EPA also has information which indicates that other types of pulp and paper mill waste, including fly ash and lime (which are not wildlife food sources) are sometimes co-disposed with sludge in these waste management units, which would further reduce the likelihood that these units would serve as a source of food.

The remainder of this letter discusses the risk assessment and other factors that lead to EPA's determination in more detail. We have enclosed copies of key supporting documents with this letter. We have also enclosed a list of all supporting information contained in RCRA docket No. F-91-PSLD, the docket established to support this determination, should you need to see any additional documents which do not accompany this letter.

As you are aware, EPA's Office of Research and Development (ORD) is currently reassessing the risks of dioxin to human health and the environment. If ORD's reassessment indicates that dioxin could pose greater risks to human health and the environment than the risks estimated in today's action regarding pulp and paper sludge, EPA will reconsider its decision not to regulate these facilities under Subtitle D of RCRA, and will so notify you. Such

reconsideration, however, is independent of EPA's obligation under the consent decree. This letter fulfills EPA's obligations under the consent decree.

#### Background:

The consent decree which is the subject of today's action required EPA to undertake a number of regulatory activities regarding pulp and paper mills, including a multi-media, multi-pathway risk assessment for 2,3,7,8-TCDD and 2,3,7,8-TCDF effluents and wastes from these facilities. EPA, the Food and Drug Administration (FDA), and the Consumer Product Safety Commission (CPSC) performed the risk assessment. The risk assessment consists of 10 separate assessments examining approximately 120 exposure pathways, including sludge disposal in landfills and surface impoundments. The multi-pathway risk assessment is entitled "Integrated Risk Assessment for Dioxins and Furans from Chlorine Bleaching in Pulp and Paper Mills" (EPA 560/90-011, July, 1990). The sludge risk assessment is entitled "Assessment of Risks from Exposure of Humans, Terrestrial and Avian Wildlife, and Aquatic Life to Dioxins and Furans from Disposal and Use of Sludge from Bleached Kraft and Sulfite Pulp and Paper Mills" (EPA 560/5-90-013, July, 1990).

Paragraph 17(B) of the consent decree required EPA to take at least one of four possible actions by April 30, 1990, concerning matters addressed in the risk assessment. The four options were:

1. Commit to propose regulations controlling risks from various exposure pathways of concern by April 30, 1991.
2. Commit to refer, under Section 9 of the Toxic Substances Control Act (TSCA), some or all matters under consideration to another Federal agency or agencies by October 30, 1990;
3. Determine not to propose regulations or make referrals to other agencies; and
4. Determine that EPA does not have sufficient information to make one of the above determinations, and establish a schedule to obtain the required information by April 30, 1991, then within 180 days after the information is gathered, take at least one of the required actions permitted in options one, two or three.

In a letter dated April 30, 1990, EPA's Deputy Administrator informed you of the results of the Agency's multi-pathway risk assessment that considered potential risks from 104 mills of concern. EPA used the results of this risk assessment to determine which pathways should be targeted for further action. Based on the results of the risk assessment, EPA informed you of the Agency's

decision to revise effluent guidelines and standards for chlorine bleaching pulp and paper mills under the Clean Water Act and to address the risks associated with land application (soil conditioning) of sludge from these mills under the TSCA.

EPA also used the multi-pathway risk assessment to make an initial determination concerning potential exposure pathways from landfills and surface impoundments that receive sludge from pulp and paper mill waste water treatment. Based on the multi-pathway risk assessment, EPA concluded that the run-off pathway was the only pathway of concern regarding risks to human health and aquatic organisms from dioxin in landfills and surface impoundments containing pulp and paper mill sludge. This result was based on extreme worst case assumptions concerning the location and physical characteristics of landfills and surface impoundments, and on available data from EPA's "104 mill" study reports on pulp and paper mill sludge concentrations.

Based on this assessment, EPA determined that additional time was needed to gather information to more thoroughly evaluate the run-off pathway from landfills and surface impoundments. EPA notified you in its April 30, 1990, letter that the Agency would gather additional information in accordance with option 4 described above.

EPA also committed in the letter to "study possible regulation of sludge run-off from landfills and surface impoundments under the Resource Conservation and Recovery Act (RCRA)" and, based on the results of its study, to make a determination to regulate or not regulate landfills and surface impoundments under RCRA by the end of October, 1991. Today's action fulfills these commitments.

Today's action addresses, in addition to the run-off pathway, potential terrestrial wildlife risks that may result from ingestion of sludge by animals that forage in landfills or surface impoundments. While this pathway was not an initial concern in the 1990 risk assessment, subsequent analysis of potential risks from the land application of sludge indicated that direct ingestion is, in fact, a pathway of concern regarding terrestrial wildlife. Consequently, EPA has addressed this pathway in today's action.

#### Basis for EPA's Determination:

Section 4004(a) of RCRA provides the Agency with authority to publish criteria to ensure that no reasonable probability of adverse effects on health or the environment results from solid waste disposal (42 U.S.C. 6944 (a)). A facility or practice which meets such criteria is classified as a sanitary landfill. A facility failing to meet the criteria is classified as an open dump. Open dumping is prohibited under RCRA section 4005 (a).

The legislative history of the Solid Waste Disposal Act does not elaborate upon the meaning of the phrase in Section 4004(a) "no reasonable probability of adverse effects." However, case law addressing the meaning of the word "reasonable" in other contexts indicates that EPA has discretion in deciding when regulation is necessary under Subtitle D. Specifically, the term "reasonable" in other statutes has been read to imply a balancing of competing factors (See e.g., American Textile Manufacturers Institute, Inc. v. Donovan, 452 U.S. 490 (1981); City of New York v. EPA, 543 F. X. 1084 (S.D.N.Y. 1981.)).

EPA has determined not to initiate rulemaking under RCRA section 4004 (a) to manage the disposal of pulp and paper mill sludges in landfills and surface impoundments based on several factors.<sup>1</sup> These factors include:

1. Potential risk to human health and aquatic organisms: EPA's revised risk assessment, which reflects more appropriate exposure assumptions and new data on existing waste management practices and site specific exposure parameters, indicates the potential for run-off and resulting risks to human health are significantly below previous estimates and minimal, even for the hypothetical most exposed individual.

2. Potential risk to wildlife: EPA's risk assessment indicates that foraging in landfills or surface impoundments may pose a potential risk to wildlife. However, current evidence does not indicate that there is sufficient wildlife activity at these sites to result in an unreasonable risk.

3. Existing State and Federal regulations: Existing State regulations provide adequate authority for protection against adverse effects to human health and the environment originating from the run-off pathway discussed under factor 1 above.

These factors are explained further below.

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<sup>1</sup> Today's action does not address the separate criteria for listing hazardous wastes under Section 3001 of RCRA. EPA has committed to consider a Subtitle C listing for these wastes under the conditions set out in the proposed consent decree pending before the U.S. District Court for the District of Columbia in Environmental Defense Fund v. Reilly, D.D.C. No. 89-0598 (the "RCRA mega-deadline" litigation). Also, in making today's decision that generic rulemaking under RCRA Subtitle D is not warranted, the Agency did not assess the potential need for any site specific order to abate any imminent and substantial endangerment to human health or the environment under RCRA Section 7003 or other authorities.

1. Potential Risk to human health and aquatic organisms: Revised exposure assumptions and new data which more accurately reflect current practices show that existing waste management practices and site specific exposure parameters reduce the potential for run-off and resulting potential risks to human health to levels well below previous estimates.

EPA used the same risk assessment methodology for today's determination as was used in the multi-pathway risk assessment. However, EPA has made some changes in assumptions used in the original multi-pathway risk assessment, which were often extreme worst-case assumptions. These generic changes were previously included in the analysis for the proposed pulp and paper mill sludge land application rule (56 FR 21802, May 10, 1991). For example, more realistic parameters concerning size of run-off drainage areas and type of vegetative cover have been incorporated into the risk assessment supporting today's action compared to the values that were used in the 1990 risk assessment. For today's determination, EPA also used site-specific exposure information such as landfill size and distance to surface water. In addition, this assessment uses site specific information on run-off and erosion controls (gathered using section 308 authority of the Clean Water Act, section 3007 of RCRA, and section 104 of the Clean Air Act) to better assess the potential for run-off at the facilities of concern.

In addition to the site-specific run-off control information, EPA collected section 308 data on the types of production process changes individual mills have made to reduce or eliminate chlorine use in bleaching processes and consequently reduce the concentration of dioxins in products, effluents and sludges. These new data were not factored directly into the risk assessment model, but were considered as supplemental information in support of today's action. The supplemental data showed that 64 facilities have made substantial changes to their bleach plant operations that in some cases may have reduced dioxin levels in effluents below the levels recorded in EPA's earlier "104 mill study" reports (which provided dioxin concentrations for the 1990 multi-pathway risk assessment). EPA has noted at least 8 categories of trends in the reduction or elimination of chlorine in pulp and paper bleaching, including, for example:

- o Increased substitution of chlorine dioxide for chlorine in the chlorination stage of the bleaching process;
- o Modernization and improvement in controlling chlorine bleaching, and
- o Increased use of peroxide to enhance the extraction stages of the bleaching process.

EPA is collecting data on additional dioxin-reducing process changes implemented since 1990.

EPA's revised risk assessment, taken together with the supplemental data, indicates that potential risks are likely to be significantly lower than EPA's previous estimates. The Agency recognizes that the site specific run-off controls, which have recently been identified, may not completely eliminate run-off; however, EPA is certain that these controls will substantially mitigate potential risks below EPA's previous estimates, which were based on a completely uncontrolled run-off scenario. The resulting risks to human health and aquatic organisms are negligible for the average exposed individual and minimal to the hypothetical maximum exposed individual (MEI).

**2. Potential risk to wildlife: EPA's risk analysis for landfills and surface impoundments indicates there is a potential for risk to wildlife that feed in landfills or surface impoundments, but these risks appear to be limited.**

The Agency's multi-pathway risk assessment did not consider risks to wildlife (other than aquatic species affected by runoff) from landfills and surface impoundments. Since that time, EPA has expanded its assessment of potential risks to wildlife. As part of the analysis of alternative disposal practices discussed in the EPA's recently proposed pulp and paper mill sludge land application rule, EPA examined potential risks to birds and small mammals which may forage in land application areas and sludge landfills and surface impoundments. Today's action reflects that analysis.

EPA concluded, based on the results of the revised risk assessment, that risks to wildlife at landfills and surface impoundments are limited and are considerably less than the risks to wildlife in areas where sludge has been land applied for two key reasons. First, the active portions of many landfills and surface impoundments do not provide a habitat (i.e., a place to live) and, second, they do not provide an attractive food source for wildlife. In contrast, open fields and forests, which are often used as land application sites, do provide habitat and a more accessible food source. These reasons are further explained below.

On an individual site basis, landfills and surface impoundments are typically much smaller than land application sites. A typical landfill or surface impoundment is 30 acres in size, although some are larger. In contrast a typical sludge land application site is 200 acres in size (again, some are larger). Even though there are many more landfills and surface impoundments than land application sites, the smaller site sizes and the lack of habitat will limit the number of animals feeding there.

As noted in the introduction to this letter (but repeated here



for convenience) EPA believes, based on the limited data we have, that active landfills and surface impoundments do not provide a suitable habitat (i.e., a place to live) for many species. Therefore, wildlife would have to come from habitat areas outside the landfill or surface impoundment to feed. Landfills and surface impoundments are often separated from habitat areas by industrial activity and structures, which would impede access to these units.

Daily disposal operations, using trucks, bulldozers, pipelines and other types of sludge spreaders, are likely to further reduce the likelihood that individual landfills and surface impoundments would be available for feeding. EPA has data that indicates that other types of pulp and paper mill waste, including fly ash and lime (which are not wildlife food sources) are sometimes co-disposed with sludge in these waste management units, which would make these units even less accessible as potential food sources.

The projected risks to wildlife that forage in these facilities could possibly be reduced by consistent application of daily or frequent soil cover. Nearly all States require daily or periodic cover for landfills, although the responses to the section 308 questionnaires showed that these requirements are often not implemented. Although EPA has concluded that actual exposures are unlikely to be significant, EPA plans to share information on the terrestrial risks to wildlife with the States, encourage them to determine whether any wildlife are actually feeding at landfills and use existing State cover requirements if they find wildlife feeding at the units. Applying daily cover to surface impoundments would not be practical unless the sludge is further dewatered. The costs of converting surface impoundment practices (including the costs of closing surface impoundments or converting them to landfills, investing in dewatering equipment, expanding landfill operations, and applying daily cover for expanded landfill operations), however, are likely to be substantial. EPA has concluded that imposing these costs is not warranted in light of the low possibility that significant numbers of wildlife are actually exposed due to feeding at surface impoundments.

Notwithstanding the previous discussion, the Agency is currently reassessing the risks of dioxin to human health and the environment, including wildlife. If the reassessment indicates greater risks or additional data collected by EPA shows significant wildlife risks, EPA will reconsider its decision not to regulate these facilities. Such activities, however, will be independent of EPA's obligations under the consent decree.

### **3. Existing State and Federal regulations provide reasonable protection against potential risks from run-off:**

EPA has gathered information on how States regulate landfills and surface impoundments receiving sludge from pulp and paper mills

and concludes that, except in the limited circumstances discussed below, existing State regulatory requirements provide adequate regulatory safeguards against potential risks to human health and wildlife that could result from run-off from these facilities.

EPA found that nearly all the 29 states in which these facilities are located require run-off and erosion controls. These controls often include berms (a widely used engineering practice) around disposal units to prevent contaminated run-off from entering or exiting the unit. Other practices include structures such as diversion ditches and final cover on the closed unit.

EPA's section 308 data on facility-specific waste management practices indicate that four facilities (three landfills and one surface impoundment) do not have run-off controls in place, although the State regulations in which these landfills are located specifically require run-off controls. The State in which the surface impoundment is located has very specific regulatory requirements to prevent run-off from landfills, but the State's regulations do not specifically identify surface impoundment run-off requirements.

Considering the scope of existing State regulations, EPA has determined that the best use of its resources is to work directly with the four States in which these facilities are located to determine whether there is, in fact, a potential for run-off and resulting risk at the four sites in question. Where significant problems are identified, EPA will either work with the States using existing State authorities, or take independent action using Federal authority (such as RCRA 7003 authority, if an imminent and substantial endangerment to human health or the environment exists, or Clean Water Act authority as described below) to correct these problems. Where appropriate, EPA will also work with the States to provide technical assistance to the companies to improve waste management practices where they are needed.

In addition to existing state regulations, EPA has recently promulgated permit application regulations under the Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES) that address certain storm water discharges (55 FR 47990, November 16, 1990) and may have applicability at some of the sites of concern. The November 16, 1990, rule addresses point source discharges of storm water from certain industrial facilities, including landfills, land application sites, and open dumps that receive or have received industrial wastes, such as pulp and paper mill sludge. Under this program, EPA or authorized NPDES States will incorporate appropriate effluent limitation guidelines into NPDES permits for such discharges after the effluent guideline for this industry is revised in accordance with the schedule of this consent decree. Before the issuance of a revised effluent guideline, EPA has the authority to incorporate technology-based performance requirements and water quality-based controls as

appropriate and monitoring for storm water discharges in NPDES permits on a case-by-case basis in the 12 States for which EPA has Clean Water Act permitting authority. This authority is reflected in a series of draft NPDES general permits for this program (see 56 FR 40948, August 16, 1991). The Agency is encouraging authorized NPDES States to incorporate similar requirements in individual and/or general permits issued to facilities in their respective States. The Agency recognizes this permit program is in its early stages and therefore may be, in the short term, limited in its application at these facilities.

#### Summary and Conclusions:

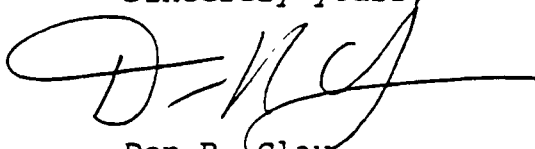
Based on a careful consideration of the factors discussed above, EPA has concluded that dioxin contained in pulp and paper mill sludges does not pose an unreasonable probability of adverse effects on human health and the environment when disposed in landfills and surface impoundments. Consequently, EPA has determined that further regulation of these facilities under Subtitle D of RCRA to further reduce potential dioxin-related risks is not warranted.

This action completes the Agency's obligation under section 17(B)(iii) of Consent Decree No. 85-0973.

**DATE DUE**

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Sincerely yours,



Don R. Clay  
Assistant Administrator

Enclosures